Detailed Description

Figure 1 illustrates an example environment for use of the invention. The example environment shown in Figure 1 is provided for purposes of discussion and is not in any way intended to limit the scope or breadth of the invention. It is contemplated that the invention may find use in a plurality of other environments, such as any environment where it is desired to perform system activation or line analysis to determine if a particular type of line activation is appropriate. The line may comprise any type of conductor or channel including, but not limited to, a twisted pair conductor, coaxial cable, Ethernet, an optic channel, or a radio frequency waveguide.

Figure 1 illustrates customer premise equipment (CPE) 100 in communication with a communication interface 102 over a first line 104. The CPE 100 comprises any communication device that is generally located remote from the communication interface 102 and configured to facilitate communication over the first line 104. In one embodiment, the CPE 100 comprises a communication modem or communication device located at a business or residence. The CPE 100 may comprise, but is not limited to, any device operating under the digital subscriber line (DSL) standard, any voice band modem, cable modem, wireless modem, power line modem, or any other device configured to perform digital or analog communication. It is contemplated that, contained in the CPE 100 and the communication interface 102, there is a receiver and transmitter configured to send and receive data over the line 104.

The first line 104 may comprise any communication medium intended to carry communication signals. In various embodiments the first line 104 comprises, but is not limited to, one or more conductors of a twisted pair of conductors, coax cable, power line, optic cable. Although the first line 104 is shown as a single line, it should be understood that the line 104 may comprise any configuration or number of conductors, optical paths, or other such paths. Other lines, channel, or paths or conductors shown throughout the figures may likewise comprise any configuration or number of conductors, optical paths, or other such paths.

In this embodiment, the communication interface 102 comprises any communication equipment configured to communicate with the CPE 100 over the first line 104. With regard to the DSL standard, the communication interface 102 may comprise a digital subscriber line access multiplexer (DSLAM). A DSLAM is configured to facilitate communication over the first line 104 between the CPE 100 and a central office (CO) switch 106 and an Internet Service Provider (ISP) 110. The DSLAM may include modems or other communication devices.

Communication with the CO switch 106 occurs over a second line 108 while communication with the ISP 110 occurs over a third line 112. The communication interface 102 appropriately routes certain voice communication from the CPE 100 to the CO switch 106 while appropriately routing certain data communication from the CPE to the ISP 110. As shown, the CO switch 106 may connect to the PSTN 116 thereby serving as a switching and routing service for telephone, facsimile, or data calls. The ISP

110 may connect to the Internet 118 to provide access to a plurality of other networked computers.

It is contemplated that the various embodiments of the invention may be used to generate, transmit, receive and process wake-up or activation signals for use in initiating a restart process for a communication device/system that was previously in a sleep or powered down state. It is desired to utilize a signal that is least affected by channel noise and provides the highest percentage of detection and the lowest percentage of missed detection. It is also desired to provide a system that is backward compatible with prior communication system. In one embodiment, the invention is integrated with modems at the communication interface 102, the C.O. switch 106, or the communication interface 102. The invention may also be used to determine a line characteristics or parameters for each leg or path for symmetrical communication (generally equal data transmission rates between devices) or asymmetrical communication (different data transmission rates between devices).

The term warm-start means a process of initiating communication between two or more remotely located communication devices. The terms wake-up and activation may be used interchangeable. In one embodiment, a warm start operation is different than a cold start operation in that the warm start operation may be faster, may require less channel retraining and may only be performed if the characteristics or parameters of the channel have not changed beyond a threshold level from the characteristics or parameters